

INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

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CORRIGENDUM NOTICE No.- I

NIT No. IACS-G/SSPDM/2023-24/57

Date: 31-01-2024

Based on the discussion in the pre-bid meeting held on 12/02/2024 at 3.00 pm via Meet to discuss the tender specifications the following changes are noted.

Tender Notice No.	Published	Modified
Last date and time of submitting tender	21/02/2024, within 3.00 PM	28/02/2024, within 3.00 PM
Date and time of opening tender (Technical Bids)	21/02/2024, 04.00 PM	28/02/2024, 04.00 PM

Technical Specifications for Pulsed laser deposition (PLD) chamber with in-situ RHEED facility:

Part / Unit	Item	Published	Modified
Vacuum requirement	Base pressure	$< 5 \times 10^{-8}$ mbar	$< 5 \times 10^{-7}$ mbar. Chamber with attachments leak tested for 5×10^{-10} torr lit/sec
	Pumping-down speed	From ATM to $< 5 \times 10^{-6}$ mbar within 30 min.	From ATM to $< 5 \times 10^{-6}$ mbar in <2 hours
Pumping System	Main pumping system	Turbo Molecular Pump (Pumping speed > 250 l/s for N ₂) with manual SS gate valve with bellow sealed shaft movement.	Turbo Molecular Pump (Pumping speed > 600 l/s for N ₂) with motorized SS gate valve with bellow sealed shaft movement.
	Sub/backing pumping system	Rotary Pump (Pumping speed > 200 l/m) with manual angle valve.	Rotary Pump (Pumping speed > 150 l/m) with manual angle valve.
	Differential Pumping system for RHEED	Combined pumping station including Turbo molecular pump (67-70 l/s for N ₂) and backing/rotary pump with compatible full range pressure gauges for RHEED part. All hosepipes and accessories to connect to the	Combined pumping station including Turbo molecular pump (67-70 l/s for N ₂) and backing/rotary pump with compatible full range pressure gauges for RHEED part. All hosepipes and accessories to connect to the RHEED

		RHEED part with PLD chamber to be provided	part with PLD chamber to be provided. Pumping station and gauge and hardware will be 2 sets
Vacuum Pressure Gauges	High Vacuum range	Cold cathode vacuum gauge (Measurement range 2×10^{-9} to 1×10^{-2} mbar)/ Nude ion gauge (Measurement range 2×10^{-10} Torr to 1 mTorr)	Cold cathode vacuum gauge (Measurement range 5×10^{-9} to 1×10^{-2} mbar)/ Nude ion gauge (Measurement range 2×10^{-10} Torr to 1 mTorr)
	Process pressure range	Capacitance manometer (Measurement range 1 Torr to 1000 Torr)/ Pirani gauge (Measuring range: 10^{-4} to 10^3 hPa)	Capacitance manometer (Measurement range 1 Torr to 1000 Torr)/ Pirani gauge (Measuring range: 1×10^{-3} mbar to atmosphere).
Laser Beam Delivery to PLD chamber	Lens, Size and material	Lens holder attachment with XYZ movement of lens for focusing the laser beam on target. 2" dia., UV grade fused silica lens and S1UV grade fused silica/ synthesized quartz laser entry window with manual gate valve.	Lens holder attachment with XYZ movement of lens for focusing the laser beam on target. 2" dia., UV grade fused silica lens and S1UV grade fused silica/ synthesized quartz laser entry window.
	Transmittance	> 93% (for KrF)	> 90% (for KrF)
Process Gas Inlet	Process Vacuum	Variable leak valve	Digital MFC
	Shut off valve	Manual valve	Solenoid/Pneumatic valve
	Digital mass flow controller (MFC)	100 SCCM of Oxygen gas	0-100 SCCM of Oxygen gas
Service Ports (include all listed ports)	Laser beam entry window	CF4.5"	CF4.5"/CF 50
	Muti-target carousel	CF8"	CF8"/CF 150
	Substrate holder/heater	CF8"	CF8"/CF 150
	High vacuum pressure gauge port	CF2.75"	CF2.75"/CF 40
	Process pressure gauge port	CF2.75"	CF2.75"/CF16

	Process gas inlet port	CF2.75"	CF2.75"/CF16
	Main evacuation path for	CF6"	CF6"/CF150
	Viewing ports (2 nos.)	CF4.5" to CF6" (Kodial/toughened glass view port with shutter)	CF 40 /CF6" (Kodial/toughened glass view port)
	RHEED Electron gun	CF4.5"	CF4.5"/CF 63
	RHEED fluorescent screen	CF6"	CF6"/CF 100
	Extra port (min. 2 nos.) for any future upgrades	Standard CF flanges (Blank)	Standard CF 63 flanges (Blank)
6-axis Multi-Target Carousel	Target selection/revolution system	Stepper motor controlled with suitable software for PC control	Motorized controlled with suitable software for PC control. PC to be provided.
	Target Rotation/rastering	Motor drive with independent controller	Motor drive with independent motor
Substrate Heating Unit	Maximum temperature	Up to 1,000 degree C in unloaded condition (>800 degree C rated)	Up to 800 degree C on sample in vacuum as well as oxygen ambient.
	Temperature control	Programmable temperature controller	Appropriate temperature controller
	Power supply control	DC power supply	DC power supply suitable for RHEED
	Temperature control	Programmable temperature controller	Manual mode and programmable when RHEED is not in use
PLD Chamber frame and System control unit	Chamber Frame with Control Rack	Power supply and controller rack for all controllers including RHEED unit. Control panels and main circuit breakers to be provided. Control signal and power lines to be connected between frame and	Power supply and controller rack for all controllers including RHEED unit. Control panels and main circuit breakers to be provided. Control signal and power lines to be connected between frame and instruments

	Purge & Venting gas and Process gas	1 line for Dry Nitrogen, 4 lines for Process gas	Gas manifold with 1 line for Dry Nitrogen, 1 lines for Process gas
Control software for PC	Suitable software for controlling listed tasks	✓ Substrate heating control ✓ Target selection ✓ Target rotation and rastering control - Substrate rotating control ✓ MFC flow rate and pressure control - Vacuum pump turn on/off	✓ Substrate heating display ✓ Target selection Target rotation and rastering control MFC flow rate and pressure control Vacuum pump turn on/off
RHEED Unit with differential pumping unit	RHEED electron gun	Electron source with maximum acceleration voltage range: 30-35 keV. CF2.75" flange mount	Electron source with maximum acceleration voltage range: 30-35 keV. Appropriate flange mount
	Data acquisition and RHEED software	High Resolution, high Sensitivity and high Speed camera 1" CCD to capture RHEED patterns onto a Data acquisition system. Minimum 2500 x 2100 pixels of 4.54 μm and 15fps, Standard hardware such as PoE GigE frame digitization board. Data Acquisition capabilities: Multiple Image mode, focus mode, scan mode, movie mode, growth rate mode, real-time exposure control & Background Subtraction, line Profile Analysis, sequential acquisition of diffraction images, multiple RHEED Oscillation Monitoring and RHEED Image Library	High Resolution, high Sensitivity and high-Speed camera with $\geq 1/2.9$ inch CCD/CMOS sensor to capture RHEED patterns on to a data acquisition system. Minimum 720 x 540 pixels or higher with ≥ 15 fps, with standard hardware such as PoE frame digitization board. Data Acquisition capabilities: Multiple Image mode, focus mode scan mode, growth rate mode, Background Subtraction, line profile analysis, sequential acquisition of diffraction images, multiple RHEED Oscillation Monitoring and RHEED Image Library (In RHEED Software / Windows Photo Software).

Registrar